[0006] Examples of safety or back-up blowout prevention systems are disclosed in (1) U.S. Patent No. 8,881,829 and U.S. Pub. Nos.: (2) 2012/0001100 and (3) 2012/0085543.

SUMMARY

[0007] Some embodiments of the present disclosure can provide for testing of a system that includes a hydraulically-actuated device having a piston movable between maximum first and second positions, in some instances, without requiring full actuation of the hydraulically-actuated device (e.g., movement of the piston to each of the first and second positions), via, for example, being configured for and/or including moving the piston to the first position and, while the piston remains in the first position: (1) reducing a force that acts to urge the piston toward the first position; and (2) increasing a force that acts to urge the piston toward the first position. Such testing may be performed automatically and/or manually to decrease a PFD of a system.

[0008] Some embodiments of the present systems are configured as a safety and/or back-up blowout prevention system having increased availability, reliability, fault-tolerance, retrofitability, and/or the like, via, for example, including a hydraulically-actuated device and a (e.g., dedicated) hydraulic pressure source for actuating the hydraulically-actuated device, a (e.g., dedicated) processor, communications channel, and/or the like for controlling the hydraulically-actuated device, and/or the like (e.g., such that the system is independent of other blowout prevention system(s), integration, and thus fault transfer, between the system and other blowout prevention system(s) is minimized, and/or the like).

[0009] Some embodiments of the present systems comprise: a hydraulically-actuated device including a housing defining an interior volume and a piston disposed within the interior volume such that the piston divides the interior volume into a first chamber and a second chamber, where the piston is movable relative to the housing to a maximum first position in response to pressure within the second chamber being greater than pressure within the first chamber and to a maximum second position in response to pressure within the first chamber being greater than pressure within the second chamber, a hydraulic pump configured to vary pressure within at least one of the first chamber or the second chamber, and a processor configured to control the hydraulic pump to, while the piston is in the maximum first position in response to pressure within the second chamber being greater than pressure within the first chamber, increase pressure within the second chamber and/or decrease pressure within the first chamber to meet a target pressure differential for a predetermined period of time, the processor further configured to

obtain at least one parameter measured by a sensor operably coupled to the hydraulically-actuated device to detect a leak within the hydraulically-actuated device or a system associated therewith. In some systems, the processor is configured to control the pressure source to move the piston to the first position. In some systems, the processor is configured

CLAIMS

1. A system comprising:

a hydraulically-actuated device including:

a housing defining an interior volume; and

a piston disposed within the interior volume such that the piston divides the interior volume into a first chamber and a second chamber;

where the piston is movable relative to the housing to a maximum first position in response to pressure within the second chamber being greater than pressure within the first chamber and to a maximum second position in response to pressure within the first chamber being greater than pressure within the second chamber;

a hydraulic pump configured to vary pressure within at least one of the first chamber or the second chamber; and

a processor configured to control the hydraulic pump to, while the piston is in the maximum first position in response to pressure within the second chamber being greater than pressure within the first chamber, increase pressure within the second chamber and/or decrease pressure within the first chamber to meet a target pressure differential for a predetermined period of time, the processor further configured to obtain at least one parameter measured by a sensor operably coupled to the hydraulically-actuated device to detect a leak within the hydraulically-actuated device or a system associated therewith.

2. The system of claim 1, wherein:

the processor is configured to control the hydraulic pump to move the piston to the first maximum position; and

the processor is configured to control the hydraulic pump to move the piston to the second maximum position

3. The system of claim 1, comprising one or more sensors configured to capture data indicative of one or more parameter values, including:

a pressure of hydraulic fluid within the system;

a flowrate of hydraulic fluid within the system;

a temperature of hydraulic fluid within the system; and/or

a position of the piston relative to the housing.

4. The system of claim 3, wherein:

the system is configured such that:

rotation of the hydraulic pump in a first direction decreases pressure within the second chamber or increases pressure within the first chamber; and

rotation of the hydraulic pump in a second direction that is opposite the first direction increases pressure within the second chamber or decreases pressure within the first chamber.

5. The system of claim 1, further comprising a motor coupled to the hydraulic pump and configured to actuate the hydraulic pump.

6. The system of claim 5, further comprising:

a battery configured to be coupled to the motor and configured to supply electrical power to the motor; and

an electric motor speed controller configured to be coupled to the motor and configured to control the motor.

7. The system of claim 1, further comprising:

a reservoir in fluid communication with the hydraulic pump; and

a remotely-operated underwater vehicle (ROV) interface in fluid communication with the hydraulically-actuated device, the hydraulically-actuated device including a blowout preventer (BOP).

8. The system of claim 1, further comprising:

an accumulator disposed between the hydraulic pump and the hydraulically-actuated device, the accumulator being configured to provide pressurized hydraulic fluid to the hydraulically-actuated device to vary pressure within at least one of the first chamber or the second chamber.

9. The system of claim 1, further comprising:

an access port disposed between the hydraulic pump and the hydraulically-actuated device, the access port configured to be fluidically coupled to a remotely-operated underwater vehicle (ROV) for transfer of hydraulic fluid.

10. The system of claim 9, further comprising an accumulator, valve, access port, and pressure sensor disposed between the hydraulic pump and the hydraulically-actuated device, the valve being configured provide fluidic communication between the hydraulically-actuated device and the access port, the accumulator being configured to provide pressurized hydraulic fluid to the hydraulically-actuated device to vary pressure within at least one of the first chamber or the second chamber.

11. The system of claim 1, wherein the hydraulically-actuated device is a component of a blowout preventer (BOP).